

UNITS AT THE INTERNATIONAL ELECTRICAL CONGRESS.

AT the suggestion of Prof. Hospitalier, Section I. of the Congress agreed that the following should be the members of the Commission on Units:—Messrs. Ayrton (Great Britain), De Chatelain (Russia), Dorn (Germany), De Fodor (Hungary), Eric Gérard (Belgium), Hospitalier (France), Lombardi (Italy), Kennelly (United States); and at the first meeting of the Commission, on August 21, which was attended also by Prof. F. Kohlrausch and Sir W. Preece—whose names had been added to the list of the Government delegates for Germany and England—a report presented to the Congress by the American Institute of Electrical Engineers was taken into consideration. This report had been drawn up for that Institute by a committee appointed for this purpose, and it contained the following resolutions:—

(1) We consider that it is necessary to give names to the absolute units in the electromagnetic and electrostatic systems, as well as convenient prefixes to designate the decimal multiples and submultiples of these units in addition to those already in use.

(2) The International Congress of Electricians, which will take place this year in Paris, should be invited to choose the names and the prefixes.

(3) A great advantage would be gained by a rationalisation of the electric and magnetic units, and the Congress should be invited to find ways and means to obtain such a rationalisation.

The proposition to rationalise the units—that is, to change them so that the coefficient  $4\pi$  should not appear—was withdrawn by Dr. Kennelly on behalf of the United States; as well as the suggestion regarding the employment of prefixes, and it was resolved that:—

The Commission will only deal with propositions that will introduce no change in the decisions arrived at at previous congresses.

A long discussion then took place as to whether it was really necessary to give names to the C.G.S. units either in the electrostatic or the electromagnetic systems, and finally it was agreed to withdraw the proposition so far as it dealt with the electrostatic system.

The desirability of giving a name to the unit of magnetic field and to the unit magnetic flux was strongly urged, and as the names of *Gauss* and *Weber* had been employed for some years in America for these units respectively, the advantage of adopting these names for the C.G.S. units of field and flux was advocated. On the other hand, the resolution arrived at by the Electrical Standards Committee of the British Association in 1895 to employ these names respectively for other units was pointed out. Finally, the Commission, at the end of their second sitting, on August 22, recommended the following:—

“The Commission is not of opinion that it is necessary to give names to all the electromagnetic units.

“However, in view of the use already of practical instruments which give the strength of a magnetic field directly in C.G.S. units, the Commission recommends that the name *Gauss* be assigned to this unit in the C.G.S. system.

“The Commission proposes to assign to the unit of magnetic flux, of which the magnitude will be subsequently defined, the name of *Maxwell*.”

These resolutions were brought before Section I. of the Congress on August 24, and led to a long discussion. M. Mascart opposed the giving a name to the C.G.S. unit of magnetic field. The employment of practical instruments for the direct measurement of the strength of magnetic fields in C.G.S. units was not, in his opinion, a sufficient reason for assigning a name to that unit. Besides, this decision of the Commission appeared to be

contrary to the spirit of the Congresses of 1881 and 1889, which did not give the names of men to the C.G.S. units. He admitted that the name of a man might be given to the practical unit. In any case, the name of “Gauss” seemed to him liable to give rise to confusion, for Gauss was the originator of the first absolute system employed, viz. that of the “millimetre-milligramme-second” system, and that system, as distinguished from the “centimetre, gramme, second” system, was still in actual use in certain cases—for the measurement of the earth’s field, for example.

Prof. Kohlrausch said that the “absolute units” were enough for the physicists, but that, if the engineers felt the need of practical units, Dr. Dorn and he did not see that any inconvenience would arise from names being given to them, such as those of Gauss and of Maxwell, for example. The German delegates could not, however, commit their Government in the matter, and they considered that the Congress should limit its recommendations to the use of these new names without seeking that legal sanction should be given to them.

Prof. Ayrton agreed with M. Mascart, and mentioned that during the past five years many “Ayrton-Mather Field Testers” had been constructed to read off the strength of a magnetic field directly in C.G.S. units, but that no need for any special name for that unit had been felt in connection therewith. He added, however, that, while holding the opinion expressed by M. Mascart that it was not desirable to give the names of persons to the C.G.S. units, the units of field and flux had this peculiarity, that without any multipliers they were the practical units adopted.

To this M. Mascart replied that the word “practical” in this connection was ambiguous, since, although it was true that the C.G.S. units of magnetic field and flux were employed in practice, they did not belong to the so-called “practical system.”

M. Hospitalier appealed to the Section to give names to the unit of field and the unit of flux. He did not ask for any legal decision in the matter, for the names were put forward as a simple recommendation to the Section.

After a discussion in which Messrs. Ayrton, Carpentier, Dorn, Hospitalier, Kohlrausch, Mailloux, Mascart, A. Siemens, Silvanus Thompson and others took part, Prof. Eric Gérard stated that in his opinion it was desirable to come first to a decision that names should be given to the C.G.S. units of magnetic field and to flux of magnetic induction.

M. Mascart, expressing his approbation of this idea, the president of the Section, M. Violle, put the following proposition formally to the meeting:—

“The Section recommends the adoption of specific names for the C.G.S. units of magnetic field and of magnetic flux.” This proposition being adopted, with only two dissentients, the meeting was adjourned for a short time to enable the members to exchange their views regarding the exact names that should be employed. On the meeting reassembling, the president put the two following propositions successively:—

(1) *The Section recommends the adoption of the name of GAUSS for the C.G.S. unit of magnetic field.*

(2) *The Section recommends the adoption of the name of MAXWELL for the C.G.S. unit of magnetic flux,*

both of which were adopted with only two dissentients.

On the same afternoon these resolutions of Section I. were submitted to the Chamber of Government Delegates to the Congress and adopted, and finally, at the closing meeting of the Congress on Saturday, August 25, the action which had been taken in the matter was formally reported by M. Paul Janet, one of the two secretaries of the Congress.